IN THE SPECIFICATION

The following amendments have been made in the enclosed substitute specifications attached hereto. The following amendments also include those previously requested in the Preliminary Amendment which was filed on June 14, 2002. Attorney for applicant wishes to note that the enclosed substitute specification contains no new matter.

Please insert the following subheading on page 1 line 5:

BACKGROUND OF THE INVENTION

Please insert the following subheading on page 1 line 7:

1. Technical Field

Please insert the following subheading on page 1 line 15:

2. Related Art

Please amend and replace the paragraph appearing on page 1 line 16, as follows:

We have established that spot-type single or multi-disc disc brakes of the kind comprising axially ~~moveable~~ movable discs can provide significant advantages over conventional spot-type automotive disc brakes. These advantages are set out in a series of patent applications which we have filed covering various aspects of the constructional differences between such brakes and conventional automotive disc brakes.

Please amend and replace the paragraph appearing on page 1 line 21, as follows:

One aspect of these constructional differences relates to the use of resilient means acting between the one or more brake discs and the rotatable mounting therefor, such resilient means being provided to control certain aspects of the dynamics or movement of the brake discs during use. Reference is made to the disclosure in WO 98/26192 ~~(docket 2558)~~ for a representative prior disclosure in this regard, and likewise too WO 98/25804 ~~(docket 2561)~~. This latter disclosure concerns a disc brake system in which a plurality of leaf springs ~~(32,42)~~ mounted on a hub [[(16)]] and engaging the brake disc [[(12)]] apply radially-directed forces between the disc and the hub.

Please amend and replace the paragraph appearing on page 2 line 11, as follows:

Such an approach is consistent with the design principles emerging from the basic structure of the disc brake in which the relatively massive central hub provides a convenient reference base not only structurally for the mounting of the biasing springs, but also a relatively massive heat sink whereby a substantial thermal gradient exists in use between the brake disc with its locally-generated thermal energy and relatively low thermal capacity, whereby thermal factors ~~favour~~ favor ~~minimising~~ minimizing the numbers of components to be subjected to frequent substantial thermal gradients, particularly components such as springs which are reliant upon thermally sensitive physical properties such as resilience.

Please add the following subheading on page 2 line 21:

SUMMARY OF THE INVENTION AND ADVANTAGES

Please amend and replace the paragraph appearing on page 2 line 22, as follows:

However, we have discovered that despite the fact that the obviously apparent factors ~~favour~~ favor the adoption of the disc-mounting principles (with respect to resilient bias) disclosed in the prior art, there are significant and unexpected compensatory advantages in adopting the reverse approach wherein it is the disc itself which provides a mounting base for the resilient means (for example a series of circumferentially-spaced springs), whereby these can be considered as exerting a resilient bias which is directed from their mounting base on the disc to the rotatable disc-mounting hub, contrary to the teachings of the prior art.

Please delete the paragraph appearing on page 3 line 6:

~~According to the invention there is provided a method and apparatus as defined in the accompanying claims.~~

Please amend and replace the paragraph appearing on page 3 line 8, as follows:

In embodiments of the invention there are provided resilient means adapted to be mounted on the axially-~~slidable~~ slideable brake disc in various ways and in various formats providing individual variations in ease of construction and mounting.

Please amend and replace the paragraph appearing on page 3 line 11, as follows:

In one embodiment the individual resilient means straddle (either as a unitary construction or as to individual resilient elements) a series of projecting drive keys constructed to ~~slidably~~ slideably cooperate with a series of complementary keyways formed in the rotatable mounting hub for the brake disc. This arrangement provides simplicity of achieving equi-spaced and likewise-balanced application of the resilient bias, without the need for cap screws or similar (potentially liable to corrosion) mounting means.

Please amend and replace the paragraph appearing on page 4 line 7, as follows:

A further practical advantage arising from the mounting of the resilient means on the brake disc or discs relates to the dynamics of the axially ~~slidable~~ slideable mounting of the brake disc or discs with the respect to the drive hub or mounting means therefor. We have discovered that one result of the mounting of the resilient means on the hub itself in prior proposals is that appreciable variations in the spring force arise from disc movement itself and from the adoption of two or more discs mounted in face-to-face relationship on the same hub or mounting.

Please amend and replace the paragraph appearing on page 5 line 14, as follows:

In this regard, it is to be noted that the resilient means or springs used in the embodiments in relation to the friction elements for maintaining same in their normal [[un-tilted]] non-tilted attitudes, differ significantly from the springs disclosed in the above-identified WO 98/25804 and WO 98/26192 specifications in which the pad springs

are mere anti-rattle springs not adapted to hold the brake pads against tilting movement, but merely to avoid rattling.

Please amend and replace the paragraph appearing on page 5 line 20, as follows:

Moreover, in the embodiments of the present invention the springs for the discs and for the pads are balanced in terms of their relative loading applied to the discs and the pads in order to achieve the necessary separation of same when braking is discontinued and yet holding the pads and discs against tilting during use. Thus, the spring forces exerted on the pads or friction elements of the present invention are much stronger than those needed merely to prevent rattling or noise suppression. The spring forces are sufficient to restrain the ~~slidable~~ slideable brake pads or friction elements from moving into contact with the brake discs in an uncontrolled manner. The use of the substantially stronger pad springs in the present embodiments assists in positioning the outer rims of the brake discs in their brake-off position for reducing residual braking torque.

Please add the following subheading on page 6 line 8:

THE DRAWINGS

Please amend and replace the paragraph appearing on page 6 line 9, as follows:

~~Embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:~~ These and other features and advantages of the present invention will become more readily appreciated when

considered in connection with the following detailed description and appended drawings, wherein:

Please amend and replace the paragraph appearing on page 6 line 13, as follows:

Figure 1 shows a diagrammatic representation of the thermal and related mass aspects and dynamic aspects of a spot-type disc brake having resilient means adapted to act between a relatively massive hub and a pair of axially ~~slidable~~ slideable brake discs;

Please amend and replace the paragraph appearing on page 6 line 22, as follows:

~~Figuress~~ Figures 6, 7, 8 and 9 show a second embodiment of the invention in views corresponding somewhat to those of Figures 2 - 5 being a side elevation view of the assembly, a plan view of a leaf spring forming one of two resilient means, a side elevation view of same and an elevation view respectively;

Please amend and replace the paragraph appearing on page 7 line 3, as follows:

Figures 10, 11, 12 and 13 show related views of a third embodiment of the invention, showing the assembly, and three views of a wire-format spring forming resilient means therefor which is adapted to be mounted on the brake disc by ~~co-operation~~ cooperation of a wire end formation with a corresponding structure of the disc;

Please add the following subheading on page 8 line 1:

DETAILED DESCRIPTION

Please amend and replace the paragraph appearing on page 8 line 2, as follows:

In Figure 1 the thermal and related mass aspects, which will be referred to and described more fully below, are indicated by references A - E in which:

A refers to the Thermal Differential;

B refers to the Relatively Massive Hub;

C refers to the Spring Effect;

D refers to the Uniform Control of Dynamics; and

E refers to the ~~Localised~~ Localized Spot-Type [[brake]] Brake [[effect]] Effect.

Please amend and replace the paragraph appearing on page 8 line 9, as follows:

As shown in Figure 1 a spot-type automotive disc brake system 10 comprises rotatable brake discs 12, 14, a rotatable mounting or hub 15 for the discs 12, 14 to permit such rotation and which is adapted to drive the brake discs and to have exerted thereon a braking effect by the brake discs when disc brake 10 is actuated.

Please amend and replace the paragraph appearing on page 8 line 13, as follows:

Two pairs of friction elements indicated at 16, 18 and 20, 22 are adapted to frictionally engage braking surfaces on opposite sides of brake discs 12, 14 to effect braking on actuation of actuation means 24 therefor. Brake discs 12, 14 are axially ~~slidable~~ slideable in use with respect to mounting hub 15 therefor under the action of friction elements 16, 18 and 20, 22 and actuation means 24 during braking.

Please amend and replace the paragraph appearing on page 8 line 18, as follows:

Resilient device or means 26 is provided at circumferentially-spaced positions around brake discs 12, 14 and is adapted to act between the brake discs and mounting therefor at said positions. The mounting of the resilient means 26 with respect to the brake disc 12, and on same, is such that the resilient means slides axially with the disc.

Please amend and replace the paragraph appearing on page 8 line 22, as follows:

Also shown in Figure 1 at 28 is an indication of the thermal differential which exists between rotatable mounting or hub 15, which has a relatively massive construction, and the brake discs 12, 14 at which actuation means 24 causes a ~~localised~~ localized spot-type braking effect.

Please amend and replace the paragraph appearing on page 9 line 9, as follows:

Turning now to the embodiments of Figures 2 - 27, these will be described with reference to the general structure shown in Figure 1 in which the rotatable mounting or hub 15 and one of the axially ~~slidable~~ slideable brake discs 12 is shown in each of the seven embodiments as part of an assembly which may comprise one, two or more discs and an associated hub, as shown diagrammatically in Figure 1. It is to be understood that the purely diagrammatic representation shown in Figure 1 is intended to be simply a convenient reference base for the technically competent person, for purposes of description, detailed structures being shown in the remaining figures.

Please amend and replace the paragraph appearing on page 9 line 17, as follows:

In the embodiments of Figures 2 - 27, the resilient means which is provided at ~~circumferentially spaced~~ circumferentially-spaced positions around the brake discs and which is adapted to act between the brake disc 12 and the mounting for the brake disc 12 at those positions itself comprises mounting means for the resilient means (in the form of a spring or springs) which is adapted to mount the resilient means at these circumferentially-spaced positions on the brake disc or discs, so that when the resilient means is so mounted it applies a resilient bias directed from the mounting of the resilient means on the disc to the rotatable mounting or hub on which the disc is mounted. The resilient bias, or force acting between the disc 12 and hub is provided and generated by virtue of the resilience of the resilient means and deformation or bending of the resilient means. As will be understood by the person skilled in the art, deformation or bending of resilient means induces stress, for example torsional stress in the case where the resilient means are twisted, this induced stress in the resilient means generating forces acting in the opposite direction to the deformation or bending and tending to counter the deformation or bending.

Please amend and replace the paragraph appearing on page 11 line 3, as follows:

Turning to the embodiment of Figures 6 - 9, in this embodiment the resilient means 26 is provided by a pair of leaf springs 54, 56, for each key 32 on brake disc 12. The leaf springs each comprise a pair of resilient flanges 58, 60 adapted to grip the disc on opposite sides thereof and a profiled location flange 62 adapted to cooperate

with the profile of a curved recess 64, at each [[side]] end of key 32, and further comprising a leaf spring end portion 66 to exert the resilient force on hub 15. The location flange 62 bears against the disc 12 whilst the leaf spring end portion 66 bears against the hub 15. As shown in Figure 6, two such leaf springs 54, 56 are provided one at each side of key 32 of disc 12.

Please amend and replace the paragraph appearing on page 13 line 8, as follows:

In the embodiment of Figures 28 - 30 the disc 12 has keys 132 which engage in keyways in the hub 15. The resilient means comprises a strip of spring steel 130. The strip 130 in its uninstalled, unloaded condition is generally linear as shown in Figures 28 - 30. The strip includes a number of apertures 140 within it and at each end 136,138 there are recesses or notches 135. In the installed loaded condition of the strip 130 it is bent and mounted within the disc 12 with the apertures 140 fitting over and straddling the keys 132 of the disc. The end of the strip 130 abut against one 132A of the keys 132 with the notches 135,137 engaging on either side of that key. The three apertures [[130]] 140 are equally spaced so as to receive the three other keys 132 of disc 12 and the portions of strip 130 therebetween extend in use, in a generally chordal direction relative to the disc inner periphery and provide the resilient effect acting between the disc 12 and the hub 15 (not shown) which is mounted within the disc. It will be appreciated that the outer periphery of hub 15 abuts against the portions 131 of strip 130 between apertures 140.